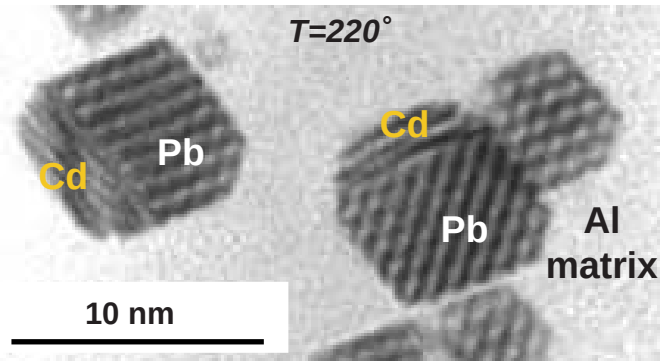
Melting in Nanometer-Sized "Crucibles" Observed

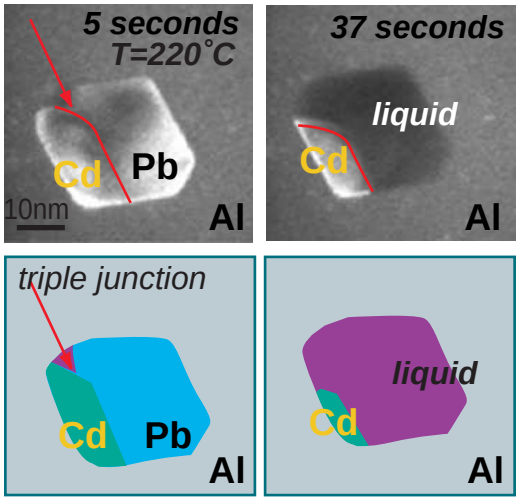
Microscopy Allows Near-Atomic Scale Resolution

Cd-Pb "ingots" in Al matrix



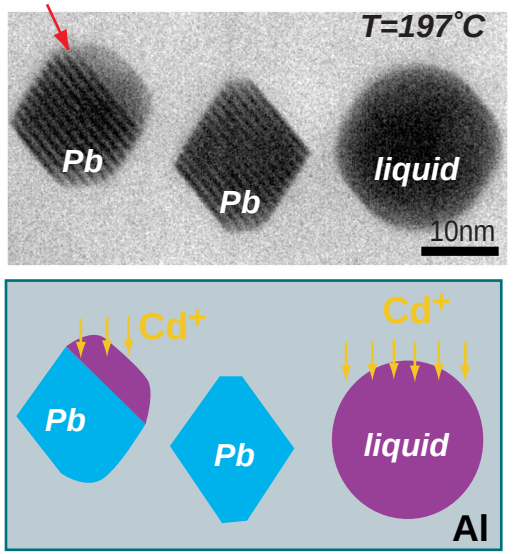
Each particle, formed by ion implantation of Cd and Pb into Al, is segregated into pure Pb and pure Cd regions, each with its own characteristic crystal structure.

Melting of Pb-Cd Alloy as a Function of Temperature



Melting observed in real time in the in-situ heating stage of NCEM's analytical transmission electron microscope initiates at the "triple junction" (arrow) between Pb, Cd, and the Al matrix.

Melting as a Function of Composition



Simultaneous Cd implantation and TEM observation is used to observe melting as a function of inclusion composition at fixed temperature. Melting initiates at specific crystallographic facets (red arrow) as the Cd concentration in the inclusions is increased.